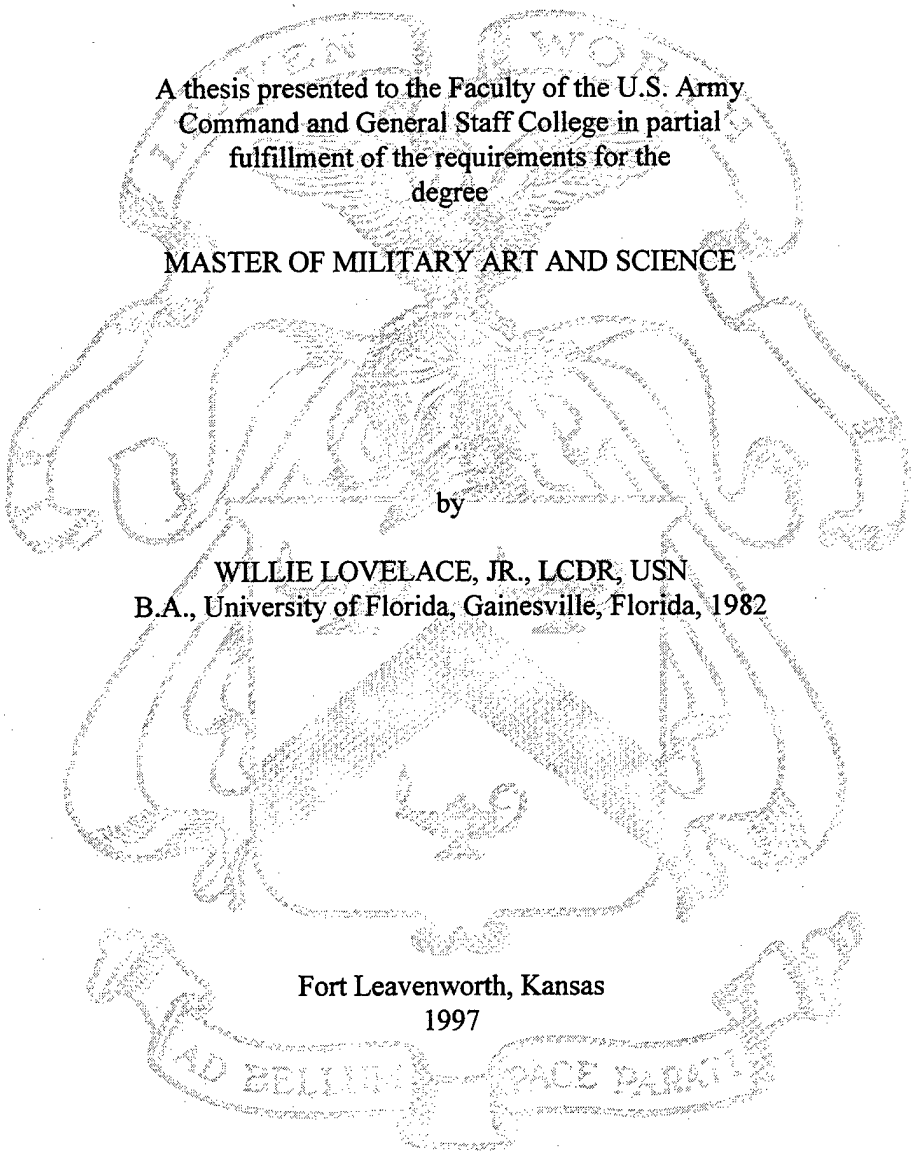
NAVAL OPERATIONS IN THE LITTORAL

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

WILLIE LOVELACE, JR., LCDR, USN
B.A., University of Florida, Gainesville, Florida, 1982



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As the United States Navy shifts its fundamental war fighting strategy away from blue-water to brown-water operations, it will be presented with a fluid and a dynamic battlefield unlike any it has faced since the early 1950s. This battlefield will demand the creation of innovative ideas and war fighting principles for the successful employment of Naval Expeditionary Forces and the maintenance of critical sea lines of communications in support of our national military strategy.

The Navy white paper, "...From the Sea," the Marine Corps concept paper, "Sea Dragon," and the proposed Navy white paper "2020 Vision for the 21st Century" attempt to exploit the inherent advantages derived from combining operational maneuvers from the sea and superior U.S. technology in achieving success within the battlefields of the littorals. However, this visualization of the battlespace may be too limited and should be broadened to include all facets of operations including sustainment issues in a joint service environment.

This study investigates the scope of naval operations as a sustaining force for the initial insertion of ground units in the near coastal environment. Specifically, it examines the feasibility and acceptablity of explanding naval operations into the rear-area sustainment environment of Army ground troops.

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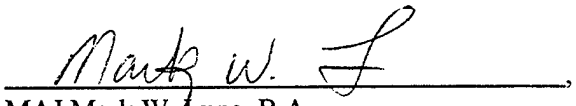 , Thesis Committee Chairman

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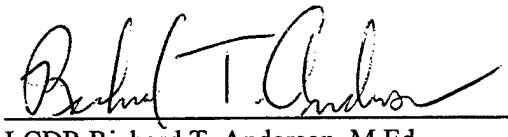 , Member

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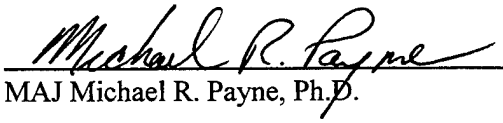 , Member, Consulting Faculty

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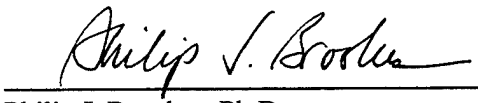 , Director, Graduate Degree Programs

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

NAVAL OPERATIONS IN THE LITTORAL by LCDR Willie Lovelace, Jr., USN, 73 pages.

As the United States Navy shifts its fundamental war fighting strategy away from blue-water (open ocean) to brown-water (coastal littoral) operations, it will be presented with a fluid and a dynamic battlefield unlike any it has faced since the early 1950s. This battlefield will demand and dictate the creation of innovative ideas and war fighting principles for the successful employment of Naval Expeditionary Forces and the maintenance of critical sea lines of communications to achieve our national security strategy and military objectives.

The Navy white paper, "Forward...From the Sea," the Marine Corps concept paper, " Sea Dragon," and the proposed Navy white paper "2020 Vision: A Navy for the 21st Century" attempt to exploit the inherent advantages derived from combining operational maneuvers from the sea and superior U.S. technology in achieving success within the battlefields of the littorals. However, this visualization of the battle space may be too limited and should be broadened to include all facets of operations including sustainment issues in a joint service environment.

This study investigates the scope and limitation of naval operations in a supporting role and as a sustaining force for the initial insertion of ground units in the near coastal environment. Specifically, it examines the feasibility and acceptability of expanding naval operations into the rear-area sustainment environment of Army ground troops.

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CHAPTER ONE

INTRODUCTION

> To be a successful commander at any echelon, you have better think about logistics and you had better make sure that when you are ready to go you have enough fuel, beans, bullets and bandages-all of the things to sustain your force.[1]
>
> -General Carl E. Mundy, Jr., NDP-1

Topic, Background, and Scope

The above maxim, attributed to General Carl E. Mundy, Jr., USMC, Commandant of the United States Marine Corps, is perhaps more applicable today than any other period in U.S. military history. With large reductions in the number of troops forwardly deployed outside of the United States and the corresponding loss of their support networks, the military can no longer depend upon having large quantities of prestaged war material in theater to meet U.S. wartime needs. The world is changing at a rapid pace. The collapse of the Berlin Wall in 1989, continuing democratic reforms in the former Soviet Union, and the dissolution of the Warsaw Pact are all examples of recent events which have virtually changed the way the United States military prepares and trains for operations. Campaigns in which large conscript armies deploy to regions around the world to fight the nation's wars are not the combat operations of the future. With more nations leaning or shifting toward democratic tendencies, the increasing cost of maintaining large militaries and the support mechanisms which drive them, demand greater responsibility and accountability on the part of military planners in the employment of these forces. Successful military leaders must learn to economize their forces to meet the uncertainties

of a post-cold war era. Simply stated, the U.S. military must learn to do more with less by redefining the size and composition of forces elected to deploy around the world to safeguard U.S. national security interests.

To influence world events overseas and to maintain its current position in a new world order, America needs a credible, forwardly deployable, power projection capability. The United States Navy has historically provided this capability. However, the battlefield of the future will demand a mixture of forces from other services, tailor-made to combat a particular threat. The answer is a power projection force--contingency forces from all services.

In carrying out these missions, these forces will most likely conduct joint operations under the framework of a unified commander or his designated representative Commander, Joint Task Force. It will be the commander's responsibility, and rightly so, to ensure that the appropriate support organization is in place to sustain this force. In order to achieve maximum initial combat power and rapid deployment with little or no advance notice, contingency forces most likely will deploy to "hot spots" around the globe with minimal logistics assets. Compounding this problem, it is equally likely that these forces will deploy to areas without the benefit of preestablished support bases with prepositioned material and will receive minimal host nation support. Regardless of the circumstances, U.S. military forces must be capable of responding to any and all contingencies despite the political situation surrounding the region and the support mechanisms in place to support it. Once deployed, the U.S. force must be capable of sustaining combat power throughout the full term of the deployment. U.S. military forces must be able to achieve economy of force and mass by sharing critical resources and support mechanisms among all branches of services. In effect, the military must create a continuous and seamless joint logistical support base to meet the demands of all of U.S. forces.

The United States Naval Services have developed a versatile new concept for projecting power ashore. As presented, this new concept would meet the needs of policy makers when deploying contingency forces and still respect the international rights of a particular region. This concept, at least on the surface, appears to be easily modifiable and capable of accommodating a brigade-sized or larger ground force similar to that of a Marine Air Ground Task Force. This new concept is known as "Operational Maneuver From the Sea (OMFTS)."[2]

OMFTS is about the projection of maritime power ashore. It offers the ultimate marriage between economy of force, effort, and mass.[3] However, contrary to traditional naval expeditionary campaigns, OMFTS is not simply putting waves of marines and sailors ashore in the traditional linear amphibious landing followed by the establishment of beachheads for the follow-on assault. Separately controlled movements, supporting operations, landings, and maneuver ashore are replaced with a decisive capability to quickly maneuver from ship to objective bringing to bear all facets of naval power. Logistics sites will be sea based on naval ships.

The introduction of follow-on ground troops through the seized landing sites will follow the initial assault phase.[4] While the sea protects the Navy front lines and flanks, the maritime force can project all of its combat power at the time and place of its choosing. The Navy will deploy its forces along broad fronts (up to 600 to 700 nautical miles), thinning the enemy's capabilities to defend the landing while massing operating systems at the decisive point to secure the military objective.[5] This concept depends highly on the U.S. ability to sustain the contingency force from sea based logistical sites similar to those traditionally employed by the Army's Division Support Command (DISCOM).

The Navy and the Marine Corps have embraced "Forward...From the Sea" as its guidance for achieving battle space dominance, to include logistical functions, through the

concepts of OMFTS and power projection. As the prime mover of forwardly deployed contingency forces operating in the joint arena of the littorals, Naval Expeditionary Forces must be willing and prepared to seek opportunities to exploit its traditional strengths and the inherent advantages achieved through power projection and the Navy's dominance of the sea. The U.S. military must be capable of expanding its influence into areas not normally associated with Navy or Marine Corps operations.

Recent operations, such as Operation Desert Storm, Grenada and Bosnia, provided U.S. forces a baseline for assessing its preparedness and ability to adequately support land operations in the joint warfare environment. But, as stated earlier, future littoral operations will most likely introduce maneuvering forces and their equipment onto hostile shores without the benefit of secured ports or support bases. Given this fact, the logistical successes in Desert Shield and Desert Storm, by virtually all assessments, were the exceptions rather than the rule. A more detailed analysis of littoral warfare uncovers the real danger of mines, coastal navies, coastal batteries and air-to-surface and air-to-air missiles. Additionally, future adversaries will not give the U.S. six months to stockpile a logistical base prior to the commencement of offensive operations. All of these dangers present a real threat to maintaining critical sea lines of support. U.S. forces will face a myriad of problems during the initial insertion and ensuing battle. These forces should not have to worry about how they are going to sustain themselves. By expanding the Navy's area of responsibility inland, overlapping coverage potentially provides protection and logistical support of ground units during this critical phase. Improved sensors and enhanced mobility should enable the Navy to dominate and control the battle space of the littorals more than ever before.

Naval Doctrine Publication 1, Naval Warfare, defines the littorals as "those regions relating to or existing on a shore or coastal region, within direct control of and vulnerable to the

striking power of naval expeditionary forces."[6] The battle space includes the air, surface, subsurface, space electronic spectrum, and the land in the objective area. While the threats in the open ocean have diminished, U.S. naval forces will be challenged in the confined and congested waters of the littoral areas. The first task of the naval expeditionary forces is to isolate the objective area; protect U.S. forces; and limit and shape enemy actions by projecting power to establish air, sea, and information dominance. Landing forces then establish land battle space dominance and project their power against objectives ashore.[7]

Operations in the battle space of the littoral will have four interleaved components--approaching the littoral, operations in and on the littoral, and leaving the littoral.[8] These components are further defined below:

1. Approaching the littoral--where the maritime force can deter or strike the enemy, but he has difficulty reaching U.S. naval forces.

2. Operating in the littoral--where the friendly and enemy maritime forces can mutually engage.

3. Operating on the littoral--the maritime expeditionary force put people ashore and support their operations (primarily from the sea).

4. Leaving the littoral--operations following mission accomplishment.[9]

Levels of Logistics Support

Naval Doctrine Publication 4, Naval Logistics, defines logistics as the science of planning and carrying out the movement and maintenance of forces.[10] In its most comprehensive sense, it includes those aspects of military operations which deal with:

1. Design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel;

2. Movement, evacuation, and hospitalization of personnel;

3. Acquisition or construction, maintenance, operation, and disposition of facilities; and

4. Acquisition or furnishing of services.[11]

Logistic support is provided at the strategic, operational, and tactical levels and involves interrelated and often overlapping functions and capabilities. Strategic logistics encompasses the nation's ability to deploy and sustain its operating force in executing the national military strategy.[12] It is concerned with determining requirements, personnel and material acquisition, management of air and sealift for strategic mobility, and support of forces in distant theaters of operation.[13] It also includes the role of prepositioned equipment and material, both afloat and ashore, and the nation's ability to maintain the required support levels for operations of any duration. Long-term sustainment is tied directly to the national industrial bases, which include the nation's manufacturing, agricultural, transportation, and health services sectors.[14] Such organizations as the Defense National Stockpile Center play a strategic role in maintaining raw materials that would be needed to support a significant buildup of the industrial base. A particular concern at the strategic level is that U.S. industrial bases maintain the capability, capacity, and technology to support timely production of modern weapon systems, support equipment, health services, munitions, stores and command and control systems to meet wartime requirements of a power projection force.[15]

Operational logistics involves coordinating and providing intratheater logistics resources to operating forces and primarily concerns the unified combatant commanders and the service component commanders.[16] It includes support activities required to sustain campaigns and major operations within a theater and is the level at which joint logistics responsibilities and arrangements are coordinated. Operational logistics encompasses theater support bases and facilities and the theater surface, air and sealift required to transport the personnel and materiel

to the supported forces--as well as managing and protecting those assets after they have delivered their materiel and services.[17] Operational logistics provides linkage to the strategic level and enables the military to succeed at the tactical level.

Tactical logistics focuses on planning and support within and among operating units of the task force or battle group.[18] The tactical commander at this level draws upon resources made available at the operational level. Navy tactical logistics encompasses the logistic support of forces within a battle group, amphibious readiness group and Navy elements ashore, from both afloat platforms including the Combat Logistics Force and shore-based logistic support facilities.[19] The tactical-level support functions include maintenance, battle damage repair, engineering, cargo handling, fueling, arming, moving, sustaining, materiel transhipment, personnel, and health services. Marine Corps tactical logistics, combat service support, is provided by a combat service support element organized to provide maintenance, supply, motor transport, medical, dental, engineering and landing support which complements the organic logistic capabilities of the aviation and ground combat elements.[20]

The proper mix of logistics support is provided by organizations that begin with the manufacturer, training facilities, and depots and end with delivering the needed product to the user. This spans the strategic, operational, and tactical levels of logistics, consisting of support organizations that are manned with high-quality, well-trained personnel from active and reserve forces and the civilian sector. Continuity of logistics support in providing an uninterrupted flow of supplies, maintenance, transportation, health service, combat engineering, and personnel-related service is paramount to U.S. success in the littorals.

Much of the operational and logistic planning involves full integration and participation in joint and multinational operations. Similarly, military planning must consider Department of Defense interservice agreements. For example, the Navy provides outfitting and logistic support

to Coast Guard ships, aircraft, and facilities to ensure that the Coast Guard is prepared to carry out assigned naval warfare tasks while operating with the Navy.[21] Special aspects involving joint and multinational participation include:

1. The capability to support or receive support from joint or multinational forces.

2. Assignment of logistics responsibilities and servicing arrangements by the Joint Force Commander.

3. The tactical and physical limitations of participating units from their services and nations to receive and provide logistics support using naval systems.

4. Early contracting for foreign logistics support (including contractual and finance personnel) and other host nation support, to ensure access to the required host nation capabilities.[22]

The emphasis on joint logistical integration demands coordination between diverse functions and organizations. Procurement, transportation, supply, personnel, maintenance, health-services systems, and information must be compatible to find, acquire, store, move, and track resources from one service to another. For example, organizations, such as the Defense Logistics Agency and General Services Administration, support all services and coordinate their activities. Transportation Component Commands of the U.S. Transportation Command (Military Sealift Command, Military Traffic Management Command, and Air Mobility Command) provide and coordinate transportation needs for all services. The current magnitude and complexity of major force deployment and resupply stretch each distribution element to its limit. Without interagency coordination, forces and logistics support will not arrive at their destination in adequate quantities or on schedule.

The Army's Field Manual 100-5, Operations, describes force projection as "the demonstrated ability to rapidly alert, mobilize, deploy and operate anywhere in the world."[23]

However, to sustain contingency forces in war and operations other than war requires major changes in U.S. doctrine, operating procedures, and support organizations. More important, it will require changes in the way the military train. Operating procedures which were successful in the past cannot be relied upon to achieve the same success in the future.

Holding onto old paradigms is the single most important factor that the U.S. military must overcome. Military commanders must be willing to venture "outside of their comfort zones." The old, preconceived way of training and doing business in the military, however, remains difficult to change. The situation must be looked at squarely as it exists: the world has changed. Military commanders and logisticians must recognize this change and adjust their thinking and subsequent planning efforts.

Force projection derived from contingency forces does not constitute rapid reinforcement.[24] Having one does not necessarily means having the other. Rapid reinforcement was appropriate in scenarios in which forces were projected into theaters with at least some degree of viable logistics infrastructure and an existing force structure. The enemy could be simply overwhelmed with superior logistics synchronized throughout the strategic-operational-tactical spectrum. In today's environment, a force-projection army can no longer rely on assumptions made from past operations and old models developed in a rapid reinforcement environment.

FM 100-5, Operations, also provides the link between the National Military Strategy and the remainder of the Army's doctrine for force sustainment.[25] The supporting spectrum of doctrine, both Army and joint doctrine, must be studied to determine its continued relevancy in light of the evolution of a force projection army. On the surface, this appears to be a fairly standard doctrinal review process; however, it is one which is still ongoing in all services.

Army and Navy support organizations, particularly today's post-cold war era combat support and combat service support elements, must be assessed for relevancy in the new strategic environment. Organizations that were designed to provide support as part of multiple-corps armies should become particular targets for scrutiny. As checks are made for relevancy, support functionality, capability, and capacity for a downsized, rapid response army should be studied.

The requirements to alert, transport, deploy, and sustain a force ranging from company to corps size present unique challenges to joint logisticians. Modifying existing logistics organizations is an approach that probably will not work. A design of modular logistics units will, most likely, be required, allowing for a building-block approach where just enough functional capability can be deployed to support the contingency combat force.[26] When the force is expanded, modular logistics units can be added accordingly and forwardly deployed with U.S. contingency forces.

While the transition to contingency-oriented, force-projection Army continues, mechanisms for the revision of combat service support to these units must be continuously reviewed. The focus must shift from the brute force, item pile methodology of past campaigns to one taking full advantage of state-of-the-art management and communication capabilities. Efficiencies must be gained without sacrifices in combat effectiveness. The logistics trains must be delivered all the way to U.S. frontline troops fighting the close battles in support of the national military strategy.

Throughout its history, the Army's logistics system has maintained a sustained commitment to provide the right support, on time, in the right condition and quantity to frontline troops in war and operations other than war. While the logistics system has assumed many forms and has continually adapted to the requirements of U.S. military strategy, its fundamental values have transcended time. Today, as the Army is aggressively undertaking a major

reorganization due to downsizing, the biggest challenge to the logistics leadership remains: acknowledging change and creating a vision for sustaining smaller, lighter forces deploying with minimum organic support.

This study will attempt to answer the question as to whether or not naval operations encompass operations in an immature rear-area sustainment environment of Army ground forces. Do naval operations provide overlapping logistical and service support to ground troops similar to those provided to an Marine Air-Ground Task Force? Can naval operations provide adequate and timely push-packages to contingency forces ashore? How do the maritime force provide for reliable communications for real-time monitoring and tracking of logistics lines in this shared environment? Can the Navy provide the necessary air superiority to protect these critical lines of communications inland? How do logistical commanders configure service support systems to tactically integrate with the amphibious force? The wide-ranging maneuver of the landing force and absence of beachheads will preclude establishing large amounts of combat service support ashore. Maintaining logistical support of the landing force will require the ability of the force to rapidly and reliably communicate its real-time logistic status to its sea base. No real research or study has been adequately devoted to assess the full extent in which naval forces can protect and support the Army's sustainment operations in the battlefield of the littorals. The study will attempt to explore this area, focusing on combined naval and land operations in the near coastal environment. It will review the objectives of the Army, Navy, and joint logistical systems in the U.S. military effort to achieve a seamless logistics system for the twenty first century and beyond. The conclusion of this study hopes to reveal a twenty first century military endowed with a well-thought-out vision for future operations in the littorals which extends combat service support seamlessly from the current strategic level through the operational and tactical levels. Accomplishing this vision will be standardized operating practices and supporting automation

and communications architectures which are both cost-effective and transparent to the user. The particular service (Army, Navy, Marines, or Air Force) providing the support to the end user would be immaterial. If a truly seamless logistical system can be created, in a modified version of itself or in some futuristic form, naval operations in the littorals would encompass operations in an immature rear-area sustainment environment of the Army unit. However, additional research is required to support or disprove this theory.

The Research Question

Do littoral operations encompass operations in an immature rear-area sustainment environment of Army ground forces?

The Subordinate Questions

Do naval operations provide overlapping logistical and service support to ground troops similar to those provided to a Marine Air-Ground Task Force? Can support teams provide push-packages to contingency forces ashore in the right amount and at the right time? How do the Navy provide for reliable communications for real-time monitoring and tracking of logistical lines? Do naval logistical assets possess the necessary lift capacity to sustain operations from over the horizon?

Underlying Assumptions

There are several assumptions upon which the premise of this thesis has been based. They include:

1. Absent a significant threat at sea, future naval operations will focus on near-shore operations and see to influence the outcome of events ashore.

2. Smaller, lighter contingency forces with limited logistical support will be deployed to fight the battles of the future.

3. Continency forces will most likely deploy to regions with limited or no host-nation support, forward support bases or prepositioned material.

4. Naval forces that fight in the littoral will be part of a joint or multinational task force.

Limitations

1. Logistical assessment will focus on those specific requirements to support the initial assault phase only.

2. A sample force is limited to three landing teams (armored cavalry squadron) deployed inland, up to one hundred nautical miles from the amphibious task force.

3. This study excludes all non-U.S. logistical support assets.

Definitions

Area of Influence. A geographical area in which a commander is directly capable of influencing operations by maneuver or fire support.

Area of Interest. That area of concern to the commander, including the area of influence, areas adjacent, and areas extending into enemy waters or territory to the objectives of current or planned operations. This also includes areas occupied by enemy forces that could jeopardize the mission.

Battle Space. All aspects of air, surface, and subsurface, land, space, and the electromagnetic spectrum that encompass the area of influence and area or interest.

Combat Service Support. The essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels of war. Within, the national and theater logistic systems, it includes but is not limited to that support rendered by

service forces in ensuring the aspects of supply, maintenance, transportation, health services, and other services required by aviation and ground combat troops to permit those units to accomplish their missions in combat. Combat service support encompasses those activities at all levels of war that produce sustainment to all operating forces on the battlefield.

Crisis Response. The ability to maintain the forces and the agility to respond quickly and decisively to regional crises with a range of options.

Force Sustainment. Capabilities, equipment, and operations that ensure continuity, freedom of action, logistic support, and command and control.

Forward Presence. Forward-deployed forces of forces overseas to demonstrate national resolve, strengthen alliances, dissuade potential adversaries, and enhance the ability to respond quickly to contingencies.

Industrial Preparedness. The state of preparedness of industry to produce essential material to support the national military objectives.

Infrastructure. A term generally applicable to all fixed and permanent installations, fabrications, or facilities for the support and control of military forces.

Integrated Logistics Support. A composite of all the support considerations necessary to assure the effective and economical support of a system for its life cycle. It is an integral part of all other aspects of system acquisition and operation.

Interagency Coordination. Coordination within the context of Department of Defense involvement, the coordination that occurs between elements of Department of Defense and engaged U.S. government agencies, nongovernmental organizations, private voluntary organizations, and international organizations for the purpose of accomplishing U.S. objectives.

Joint. Connotes activities, operations, organizations, etc., in which elements of more than one service of the same nation participate.

Lines of Communications. All the routes, land, water, and air which connect an operating military force with a base of operations and along which supplies and military forces move.

Littoral. Those regions relating to or existing on a shore or coastal region, within direct control of and vulnerable to the striking power of naval expeditionary forces.

Logistics. The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations which deal with: (1) design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material; (2) movement, evacuation, and hospitalization of personnel; (3) acquisition or construction, maintenance, operation and disposition of facilities and; (4) acquisition of furnishing of services.

Maritime Preposition Force. Civilian-crewed, Military Sealift Command-chartered ships which are organized into three squadrons and are usually forward deployed. These ships are loaded with propositioned equipment and 30 days of supplies to support three marine expeditionary brigades.

Marine Air-Ground Task Force. A task organization of Marine forces (ground combat, air, and combat service support elements) under a single command and structured to accomplish a specific mission. The MAGTF will also include Navy support elements.

Multinational. An alliance, coalition, or other international arrangement.

Multi-Service. Two or more services in coordination.

National Command Authorities(NCA). The President and the Secretary of Defense or their duly deputized alternates or successors.

Naval Surface Fire Support. Fire provide by Navy surface gun, missile, and electronic-warfare systems in support of a unit or units on land.

Power Projection. The application of offensive military force against an enemy at a chosen time and place. Maritime power projection may be accomplished by amphibious assault operations, attack of targets ashore, or support of sea control operations.

Starter Stocks. War reserve material stocks prepositioned in or near a theater of operations and intended to last until resupply at wartime rates is established.

Swing Stocks. War reserve material stocks positioned ashore or afloat for meeting war reserve requirements of more than one contingency in more than one theater of operations.

War Reserve Material. Mission essential secondary items, major end items and munitions required to attain operational objectives in the scenarios authorized for sustainability planning in the Secretary of Defense planning guidance.

This thesis will be based on an assessment of the United States Navy's ability to support and sustain an Army Armored Cavalry Regiment operating in the joint environment of the littoral.

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[1]Department of the Navy, Naval Doctrine Publication 4, Naval Logistics (Washington, DC: Government Printing Office, January 1995), p. 11.

[2]Department of the Navy, "Operational Maneuver From the Sea: A Concept for the Projection of Naval Power Ashore" (Washington, DC: Government Printing Office), 1.

[3]Ibid., 1-2.

[4]Ibid.

[5]Ibid.

[6]Department of the Navy, Naval Doctrine Publication 1, Naval Warfare (Washington DC: Government Printing Office, March 1994), p. 73.

[7]Operational Maneuver From the Sea, p. 3.

[8]Robert J. Murray, "Focus 96: Littoral Operations (Washington, DC: Government Printing Press, August 1996), 8.

[9]Ibid.

[10]Naval Doctrine Publication 4, Naval Logistics, 77.

[11]Department of the Army. FM 100-5, Operations (Washington, DC: Government Printing Office, 14 June 1993), G-5.

[12]Naval Doctrine Publication 4, Naval Logistics, 7.

[13]Ibid.

[14]Ibid.

[15]Ibid.

[16]Ibid.

[17]Ibid., 9.

[18]Ibid.

[19]Ibid.

[20]Ibid.

[21]Ibid., 43.

[22]Ibid., 44.

[23]Field Manual 100-5, p. 3-1.

[24]Department of the Army. U.S. Army Command and General Staff College, Logistics: Desert Storm and Into the 21st Century (Ft. Leavenworth, KS: USACGSC, August 1996), 65.

[25]Field Manual 100-5, p. 1-3.

[26] Logistics: Desert Storm and Into the 21st Century, 66.

CHAPTER TWO

LITERATURE REVIEW

Historically, the Navy and Marine Corps have functioned as a team to project firepower and maneuvers from the sea into coastal regions of the world. Several studies and concept papers have been written detailing U.S. leaders' visualization for the conduct of these operations and for maximizing the inherent advantages they present when properly synchronized. In an effort to assess whether or not naval operations encompass operations in an Army brigade's rear-area sustainment environment, this study will review current and past Navy and Marine Corps strategies for their historical value and insight for future operational planning and strategic development. Historical publications mark the starting point for the literature review. These publications are useful in that they provide subject-matter expertise in the successful employment of naval forces in the battlefields of the littoral. The following is a summation of current literature devoted to the study of this subject:

Thesis: " Will 'Forward . . . From the Sea' Support Sea Dragon." W. E. Hardy's master's thesis examines the joint Navy/Marine Corps relationship in some details. His work questions whether or not naval operations support the deployment of a Marine expeditionary force. During his examination, he reviews " . . . From the Sea" and "Sea Dragon" (the Marine Corps concepts paper for future operations). "Forward . . . from the Sea" shifted the primary focus from blue water operations to the brown water of the littorals. It provides the framework for the creation of Naval Expeditionary Forces to mass combat power at decisive points on the battlefield. The Marine's strategy, *Sea Dragon*, seeks a balance between the inherent advantages

of maneuvering forces from the sea and the high-technological precision-strike capability of the U.S. Navy.

The master's thesis, "Influencing the Land Campaign from the Sea: The Interaction of Armies and Navies in the American Revolutionary War," written by H. P. Bolich, Naval Postgraduate School, Monterey, California attempts to unveil the causal relationship between developments at sea and the shaping of land campaigns. The author suggests that command of the sea offers distinct advantages to commanders of land forces ashore. These advantages include: mobility of troops and logistics, operational initiative, improved geographic access and surprise. Readers are warned that naval superiority alone is not enough to guarantee an advantage. Naval forces must seek and win command of the sea before that command can be fully exercised. The work further analyzes the interaction between land forces and naval operations during the American Revolutionary War. An attempt is made to link land campaigns with changes in naval developments at sea. Linkage is established and the author concludes that the development of land campaigns can be influenced by naval operations at sea.

The government report Inchon-Seoul Operation: A Lesson in the Design of Operational Maneuver from the Sea, written by W. R. Mitchell, Naval War College, Newport, Rhode Island, includes a case study which examines the Inchon-Seoul campaign in an attempt to derive lessons learned from the successful application of "Operational Maneuvers From the Sea." The author suggests that the conceptual "Operational Maneuver From the Sea" used in this campaign is timeless. It is as applicable today as it was to sea and land commanders during this campaign. The author concludes that this

concept of maritime strategy can enable the Navy to prevail in battle of littoral warfare today and in the future.

In Operation CHROMITE: Power Projection . . . From the Sea, P. E. Buckley, Naval War College, Newport, Rhode Island analyzes aspects of Operation CHROMITE for the lessons applicable to land and sea component commanders in meeting the challenges U.S. forces will face in future regional contingencies. The author suggests that favorable resolution of threats to U.S. security will necessarily mandate the projection of power and maneuvers from the sea. This study concludes that increasingly limited military resources and reductions in forward basing of U.S. forces dictate changes in U.S. strategy in the littorals.

Department of the Navy 1995 Posture Statement--The Navy-Marine Corps Team, produced by Department of the Navy, Washington, D.C. contains a posture statement that outlines the programs, policies, and organizational changes designed to keep the Navy and Marine Corps in step with rapidly changing national security challenges.

The conference proceeding "Annual Admiral Charles M. Cooke Conference (5th) for Naval Strategists and Planners," held at Newport, Rhode Island, on 15-17 March 1994, summarizes the presentations and discussions provided at the Cooke Conference. The theme of the conference was Naval Expeditionary Warfare.

The government report Synchronization of Littoral Operations, written by D. Wheeland, Naval War College, Newport, RI examines several major historical littoral operations to determine the synchronization factors that might be applied to future operations. Naval operational maneuvers (amphibious landings) are emphasized. The author suggests that historically synchronization has constituted a major factor in littoral operations and despite advancements in technology, the Navy will still have to synchronize maneuvers with firepower, intelligence, and logistical support. The study implies that successful land operations cannot be sustained for long periods of time without adequate resupply and service support.

W. F. Foster's study From the Sea: Refining an Old Idea examines three cases where U.S. military forces conducted joint operations in a littoral environment, Operation CHROMITE, in Korea (1950), Operation BLUEBAT in Lebanon (1958), and Operation POWER PACK in the Dominican Republic (1965). The author suggests that each operation was successful in achieving its operational goal and provides lessons concerning joint force employment for use in future operations. Areas examined include operational planning, command structures and relationships, force employment, logistics, and interoperability issues.

The government report Possible Logistical Implications of '...From the Sea.' by C. G. Deitchman, Naval War College, Newport, Rhode Island, utilizes the Navy white paper "...From the Sea" as the basis for examining the difficulties in carrying out joint littoral warfare from a logistical point of view. The study examines the Navy Logistics and the Joint Logistics over the Sea System to highlight logistical difficulties in areas where port accessibility were unavailable. Finally, this study offers suggestions to minimize potential problems in sustaining forces without the use of port facilities.

H. J. Krauss' From the Sea in 1950: Lessons for the 21st Century From Operation Chromite provides a historical study of the United States' last major amphibious operation, with joint and combined forces during a major regional conflict. This study suggests that current U.S. naval forces may be plagued by a similar demobilization trend which mirrors the strategic culture of the 1940s. The study highlights perceived weaknesses the naval service will bring into the twenty first century for a littoral Navy: insufficient gunfire and amphibious lift resources.

"Operations in the Littoral" by Karl Semmler, Naval Doctrine Command, Norfolk, Virgina, develops and examines new operational concepts that will maximize the potential of future naval forces while enhancing the capabilities of the current force. It draws up the expertise of a wide range of activities within the naval community including input from the fleet.

The purpose of this study attempts to identify an overarching concept for naval operations as part of, or the whole of, a joint or multinational campaign in the early years of the twenty first century. The author analyzes the future battlefield of the littorals and identifies supporting functional projects which further define conceptual details to littoral operation.

The monograph "Operational Sustainment in an Immature Theater," by Yves J. Fontaine, United States Army Command and General Staff College, identifies critical sustainment issues for the deployment of contingency forces to an immature theater and analyzes the doctrine's adequacy as it provides guidance to an analysis of four contingency operations; the 1964 U.S.-Belgian hostage rescue in the Congo, the 1965 U.S. intervention in the Dominican Republic, and the 1982 British campaign in the Falklands. The study identifies repetitive sustainment problems with each operation, compared with the following sustainment considerations: planning; deployment; command, control and communication; synchronization logistics intelligence; forward basing; air superiority future sustainment; and medical evacuation. The analysis reaffirms the doctrine's adequacy in addressing the issues.

The monograph " Sustainment of Theater Army Forces: The Essence and the Art," by Michael E. Ivy, U. S. Army Command and General Staff College, Fort Leavenworth, Kansas, examines two of the assumptions which underlie the Joint Chiefs of Staff support planning model as they relate to sustainment of Army forces in a unified command's wartime campaign. One is that lines of communication are secure. The second assumption is that an intratheater means of distribution exists, which is normally associate with ports, airfields, roads and railroads, and their operating units. These tow assumptions are analyzed using theoretical, doctrinal, and historical criteria. The analysis concludes that secure LOCs and infrastructure capabilities are absolute requirements to sustain Army forces in a unified command's wartime

campaign. The analysis further indicates that infrastructural requirements will vary greatly between theaters.

The article "U.S. Navy Chief offers his vision to Congress," in Jane's Defense Weekly, international edition, by Admiral Jay Johnson, recently sworn in as Chief of Naval Operations, provides his vision of a Naval Expeditionary Task Force as the maritime component of the future. He suggests this concept could form the basis for moving naval operations landward from the littoral region.

The document Logistics: Desert Storm and Into the 21st Century *is* a composition of logistical support-related readings designed to provide students in attendance at the Army Command and General Staff College an enriched understanding of a wide spectrum of recent logistics issues and events. Articles are targeted on the logistics challenges of today's and future armies. The goal of this work is to provide examples and studies that will prompt creative logistical thinking. It is a collection of various authors' experience, concepts, and opinions, but provides significant insight on the implications of sustaining future armies of the twenty first century.

CHAPTER THREE

RESEARCH DESIGN

This study will use the operations research and rystems analysis (ORSA) method as the primary technique for gathering data to determine if naval operations in the littoral provide adequate logistical support for an Army's brigade-sized organization utilizing sea-based naval assets. The Navy-Marine Corps's vision for future operational maneuvers from the sea suggests conducting amphibious assaults, by air and surface, from over the horizon (25 to 200 miles), possibly on a very broad front, maneuvering directly to objectives well inland (50 to 200 miles), and providing logistics support from the sea. Such ambitions if applied to an Army corps or division-sized formation (the Army's Force XXI tactical formation) are unrealistic--logistically unsupportable. However, logistical support of smaller, more modular, task-organized forces are well within the capabilities of the Navy. The question which this study will attempt to answer is, how large a force can naval operations reasonably support?

Scenarios in which contingency forces are most likely to be deployed will vary depending on the situation. The specific mission, enemy, terrain, and other mitigating factors will determine the size, means of transporting , equipment, and composition of the deploying force. Given the scope of these uncertainties, this study will utilize a hypothetical sample force for notional planning purposes. Aditionally, the support effort will be limited only to those forces which constitutes the initial assault echelon. The balance of the force would be in the assault follow-on echelon, and would be transported by cargo vessels operated by Military Sealift Command or by civil, and military aircraft from the Air Mobility Command (including

the Civil Reserve Air Fleet). Deploying ground forces will consist of a three armored cavalry squadrons. Supporting naval forces will include one carrier battle group (CVBG), and one amphibious readiness group (ARG), each with their corresponding airwing.

The research methodology will consist of a historical, and doctrinal analysis as well as a technical analysis in determining the logistical implications of supporting Army units from sea-based assets. The historical analysis will focus on the logistical support of two recent campaigns (War in the Falklands and Grenada). In addition to the historical analysis of these important cases, and a review of doctrinal concepts, and principles for providing support in the joint environment will be undertaken. The technical analysis (upon which most of the conclusions from this thesis will derive) will assess the significance of the physical constraints placed upon Army and Navy logistical planners in meeting the logistical requirements for forces in the year 2010.

Scenario

The United States has deployed an amphibious task force, consisting of a Carrier Battle Group (CVBG) and an Amphibious Readiness Group (ARG), to the littoral waters of a coastal belligerent nation. These forces, including ground forces of an Armored Cavalry Regiment (Light), are deployed into the area without the benefit of fixed port facilities, established infrastructure or host nation support. While still over the horizon, the task force deploys three landing teams (armored cavalry squadrons) to objectives well inland, and widely dispersed, up to one hundred nautical miles from the amphibious task force. As an initial entry force, the ACR would support the JTF operations with credible force as a demonstration of U.S. resolve. They are landed and sustained by air and sea using LCACs, CH-53Es, and MV-22s. These landing teams will serve to place and monitor sensors, direct ship-to-shore fire and air strikes, block, and

confuse enemy actions, and ultimately, attack to seize a limited objective. They will operate at long distance from the ships, over the horizon for one to seven days.

As postulated by the OMFTS concept, the introduction of land forces from the sea in this scenario will most likely be unopposed. Nevertheless, absent direct enemy threats, the environment, and circumstances of amphibious operations, may mitigate against efficiency in logistics support. Tough seas, high winds, mud or dust, and the confusion, and fast paces of military activity will probably take their toll over an extended period. Since explicit consideration of all such factors is difficult at best, this scenario will minimize the effects of these factors as much as possible. Weather conditions for this operation will be light to moderate, having no adverse effect on U.S. operations. Likewise, sea state conditions will be negligible.

The composition of the Armored Cavalry Regiment (ACR) is outlined in table 1. This particular organization is selected due to its robustness and its organic logistical capability. The ACR (light) is a self-contained combined arms organization, but is capable of being packaged and rapidly deployed by air or sealift as part of a power projection force responding to worldwide contingencies. Because of its unique command and control structure and support base within the regiment, it is very modular and capable of rapidly integrating its forces into task organizations. This factor supports the scenario with a force that can be tailored for the situation and expanded once it is deployed ashore if the situation dictates. To assess the full logistical implications of OMFTS, the ACR will be deployed with its direct support artillery, although the conceptual notion of OMFTS tasks naval forces with providing naval fire support.

TABLE 1

LANDING TEAM COMPOSITION

Armored Cavalry Regiment (Light)	No. of People
HHT	150
Armed Cav Sqdn, ACR (3)	2492
Regt Aviation Sqdn	489
ADA Btry Vul/Stinger	172
Engr Co.	200
MI Co.	159
Chml Co.	73
Spt Sqdn	728
Total	4463

Source: Department of the Army, ST 101-6, G1/G4 Battle Book (Ft. Leavenworth, KS: U.S. Army Command and General Staff Colege, July 1996), 1-18.

Research Phasing

Phase I: Develop the research material and perform a detailed analysis of logistical support issues and current capabilities.

Phase II: Formulate the research results, develop the conclusions, and prepare the final research paper.

Pertinent questions to be developed during the technical analysis include:

1. What are the notional daily sustainment requirements to support an Armored Cavalry Regiment (ACR) for sixty days of operations? Functional areas of service support provided the sample force to include: (1) ammo, (2) fuel, (3) water, (4) rations, and (5) maintenance

2. What are the current service support capabilities/limitations of the Amphibious Task Force? What is its current lift capability?

3. What sustainment assets/capabilities does the U.S. Army bring to this hypothetical scenario? Can the Army provide heavy airlift support for material movement?

4. What are the daily sustainment requirements for the sample task force?

5. What are the maximum over-the-horizon daily transport capacities of our force (per vehicle)?

6. What are the Landing requirements for the landing force?

Information sources for this thesis include reports available from the Government Printing Office (GPO), National Technical Information Service (NTIS), archival documentation, professional journals, doctoral dissertations, and master's theses (published, and unpublished), and the Educational Resources Information Center (ERIC).

CHAPTER FOUR

ANALYSIS OF RESEARCH DATA

This chapter is divided into two major areas of concentration. Part I provides a historical and doctrinal analysis of two recently conducted military operations involving contingency forces assembled from two or more services. The first case study examines contingency operations conducted by U.S. forces during its invasion of Grenada in 1983. The second case involves contingency forces from Great Britain deployed into the South Atlantic to secure the Falkland Islands following their invasion by Argentina. Part II of this chapter will provide a detailed technical analysis of the logistical service support and lift capabilities organic to the Naval Expeditionary Force earmarked to conduct "Operational Maneuvers from the Sea" in the year 2010. The case studies selected in this thesis (The War in the Falklands and Grenada) will serve as the benchmark for assessing our hypothetical sample force with regards to sustainment issues and possible implications which may hamper combat operations of the future.

Part I: Historical and Doctrinal Analysis

Grenada Operation--Operation Urgent Fury 1983

Located at the end of a chain of Caribbean Islands, known as the Lesser Antibes, Grenada sits astride the main shipping lane for supertankers that bring U.S. imported oil from the Mideast and Africa. Additionally, Grenada is in easy striking range of the Venezuelan oil fields, another strategically significant source of U.S. imported oil. It is no wonder that the U.S. became concerned when Cuban engineers began construction of an airfield capable of receiving

long-range military aircraft. The U.S. concerns heightened in 1980 when Grenadian leaders signed a treaty with Moscow, giving the Soviets landing rights on Grenada.[1]

In October 1983, an U.S. task force was dispatched to Grenada to evacuate U.S. and foreign citizens and to reestablish a democratic regime in the area.[2] The operation has been described as a "come as you are" scenario: a pick-up game--typified by critical time sensitive mission requirements, minimal planning, employment of joint and combined forces, incomplete intelligence, logistical support, C3 intensity, and high political visibility.

The initial actions taken in response to the unrest in Grenada included diverting the USS *Independence* and Navy and Marine amphibious groups from deploying to Lebanon and preparing the 82nd Airborne Division for deployment to the theater of operation.[3] Concurrently, Admiral Wesley McDonald, Commander in Chief of Atlantic Command, received the mission to conduct operations to protect and evacuate U.S. and designated foreign nationals from Grenada, neutralize Grenadian forces, and stabilize the internal situation.

The Atlantic Command immediately organized a large task force headquarters to plan and coordinate the operation. JTF 120 was thus established and the commander designated as Vice Admiral Joseph Metcalf III.[4] A seventeen-man joint staff quickly assembled on the ship *Guam* to plan the operation. However, most of the officers had never worked together, were unknowledgeable or the other services' method of operation, and forced to work in isolation due to operational security (OPSEC) requirements.

Although a contingency plan existed in the Pentagon for intervention in Grenada, planners ignored it for a new concept. The concept changed the command and control structure by eliminating the XVIII Airborne Crops Headquarters' involvement in the operation. The planners, however, kept the 82nd Airborne Division involved in the operation, splitting an established chain of command and altering logistics relationships. The concept divided the

operation in three phases: Phase one called for the surprise seizure of the island and the rescue of the governor and medical students. Phase two called for the arrival of Task Force 121 of the 82nd Airborne Division to establish order. Phase three involved peacekeeping duties. Throughout the operation, the naval battle group provided surface and air support.[5]

The actual operation was plagued with many setbacks. Special operation forces encountered numerous problems caused by poor intelligence on available landing zones, insufficient quantities of heavy weapons, logistical support, equipment, and inaccurate maps.[6] The special forces failed to achieve surprise and to capture critical objectives, such as the radio transmitting stations and the prison. Ultimately, the Rangers and Marines captured Saline and Pearls airfields allowing deployment of the 82nd Airborne Division which defeated the Grenadian and Cuban forces and rescued the U.S. citizens. However, the confusion caused by the strong Grenadian defense resulted in requests of unnecessary reinforcement.

Although due to security reasons, logistics planning was deliberately kept separate from operational planning. Logisticians saw transportation and sustainment requirements, particularity the deployment capabilities of the 82nd Airborne Division as requiring special attention because of the distance involved between the two nations. Therefore, sustainment planners first planned to use C130 aircraft with inflight refueling capability to deploy the force without stops to Grenada. Second, they established a forward-staging area in Barbados, capable of receiving C5A aircraft which could not land in Grenada. The forward staging allowed the deployment of large items, such as helicopters, for use in the theater of operation.

The concept of support called for air deployment of forces to Grenada.[7] Lines of communication were established from Fort Bragg to Pope Air Force Base to Grenada to support the deployment of forces and light equipment, and from Fort Bragg to Pope Air Force Base to Barbados to Grenada to deploy heavy equipment. Airborne troops were to deploy with three

days of supply to provide time for the establishment of logistic stockage at Saline Airport, Grenada. Once established, the 82nd Airborne Division support command (DISCOM) would provide combat service support forward using direct requisitioning procedures from Grenada to Fort Bragg through the tactical satellite system. A regular replenishment air flow of two aircraft per day would ensure daily resupply, and the extensive use of captured equipment, particularly wheeled vehicles, would augment transportation shortage on site. Even though an actual medical evacuation plan did not exist for this operation, the 82nd Airborne Division deployed with minimal organic medical assets, counting on the Navy to provide backup hospital support.[8]

A review of the actual support of the operation identified numerous logistical discrepancies. Problems in planning, deployment, command and control, logistics intelligence and synchronization affected the sustainment to combat soldiers.

The rapid planning and overuse of security adversely affected the entire operation.[9] First, the Joint Task Force Headquarters was established rapidly, which meant the staff member had no prior working experience before the operation. Second, as seen in similar U.S. campaigns (e.g., the Dominican Republic operation), Joint Task Force planners did not consider searching for an already- developed contingency plan. The use of an existing plan would have identified a different but already established chain of command and prevented some of the logistics problems which hampered this operation. Third, under the guise of operational security, the commander of the 82nd Airborne Division was kept in the dark until the last moment, which forced him to plan rapidly for the operation. Finally, the minimum involvement of logistics planners in the overall concept directly affected the operation resulting in airflow backups at Saline airfield and in emergency requests for replenishment that could have been anticipated and planned.

The problem in planning forced the 82nd Airborne Division to deploy rapidly regardless of loading plans. The small amount of vehicles available for deployment obliged soldiers to carry three days of supply (Classes I and V) on their backs accentuating fatigue. More important, it precluded the units from using long-range communication capability and affected air defense Stinger weapon ammunition resupplies.[10] Logistically, the rapid planning and loading prevented the timely deployment of forklifts to the theater of operation. The lack of forklifts drastically slowed the unloading process in Grenada and concurrently increased the waiting time for other aircraft to land. Some of the aircraft were diverted to Barbados.

Command, control, and communications procedures were problemsome as seen in other U.S. campaigns. First, Admiral Metcalf, located offshore, led the ground forces on shore.[11] Despite good reasons to designate a single ground force commander, Admiral Metcalf maintained a centralized C2 system which kept forces separated rather than working together. The failure to designate a single ground force commander created problems in coordinating support between services. Particularly noteworthy are the conflicts to prioritize resupply shipments and the difficulty in coordinating medical evacuation.

Second, the inability of the services to communicate with one another surfaced as one of the largest problems encountered in the operation. Joint Task Force 120 failed to establish adequate communications for the force, and the communication equipment was incompatible.[12] Logistically, the confusion in communications meant that all units developed their own systems to request replenishment. Units used the operations net versus logistics net to obtain support. In frustration, they often bypassed the established system for replenishment which caused duplication of requests and loss of control.

Additionally, the lack of a secure communications system limited the Military Airlift Command's (MAC's) ability to effectively command and control airlift assets.[13] Again, this

resulted in confusion and ultimately in additional airplanes sent to fill duplicated requests jamming the already crowded airfield. The problem was eventually solved by centralizing airfield control at ports of debarkation and ports of embarkation.

Missing intelligence caused major problems for the forces as they prepared to invade the island.[14] Logistically, the missing intelligence on road networks, suitability of landing beaches, and a general layout of the area prevented planning for proper logistics support. For example, the failure of logistics intelligence to identify potable water supplies in Grenada resulted in paratroopers carrying additional canteens of water to combat, thus additional weight. The Barbados defense force had the intelligence available; however, the JCS did not include them in the planning.

The lack of coordination between Joint Task Force planners due to excessive OPSEC resulted in the rejection of an already-developed OPLAN, and caused loading problems, deployment problems, and requisitioning problems. Excessive OPSEC prohibited Joint Task Force planners from synchronizing the plans for the operation with logisticians until the last minute. Additionally, critical personnel in the 82nd Airborne Division were denied access to the plans because of operational security. The restrictions resulted in rapid logistical planning and affected the type of support forwarded to combat units in Grenada as officers with no knowledge of the plan made decisions on replenishment needs to the theater.

Similar to the British's Falklands experience, the medical support suffered from lack of planning and synchronization. A plan did not exist nor was one developed to coordinate joint medical operations. As already identified, combat service support planners did not assist in planning the operation, nor did they formulate an overall medical command structure headed by a joint task force surgeon. The concept called for the USS *Guam* and *Trenton* to provide medical and surgical support. Based on this information, ground forces deployed with minimal organic

medical support counting on rapid evacuation to the Naval fleet. Due to a lack of synchronization, however, medical officers from the other services did not know of the evacuation plans. Additionally, actual evacuation by air was impaired by the lack of Army pilots trained to land on ships. Nevertheless, all these problems did not stop the U.S. medical forces from accomplishing their mission through improvisation, tactical-level coordination and flexibility.

The U.S. experience in Grenada demonstrated the need for a good plan to sustain forces not only during the assault but after the battle was well. The original plan anticipated stability operations which consisted of internal security, psychological operations, and civil affair programs. The goal was to establish an atmosphere of well being and assist Grenada on its path toward democracy.

In summary, the Grenada operation was a success. However, the U.S. forces experienced significant logistical problems caused mainly by the rapidity in planning and the excessive operational security criteria which prevented necessary synchronization to take place.[15] The costs of these problems were a rise in emergency requisitions and a concurrent impact on the airflow into Grenada. Nevertheless, U.S. forces demonstrated the flexibility to adapt to the situation and achieved the mission.

The Falkland Islands Invasion

The Falklands are a group of islands under British rule located 8,000 miles southwest of the United Kingdom, more than 4,000 miles from Ascension Islands and 400 miles from the Argentine mainland. On 2 April 1982, an Argentine Task Force composed of one aircraft carrier, three destroyers, three transporters, two corvettes, and one landing ship invaded the Falkland Islands.[16] In response to the Argentine invasion of British territory, Britain deployed

its contingency forces with rapid speed. Britain formed Task Force 317, consisting of a carrier group and a landing task force group.[17] This force had a mission to conduct military operations to reestablish British control over the Falklands.

There were two phases to the campaign:[18] Phase one from 1 to 21 May consisted mainly of naval and air engagements in which the Argentine suffered tremendous aircraft losses and the British lost six major ships. Phase two from 21 May to 14 June consisted of an aggressive British offensive after a landing at San Carlos beachhead and included ground attacks which resulted in the Argentine surrender.

The logistics support to this operation and the dispatch of a task force in such a short time were magnificent achievements. They resulted from close cooperation between services, the merchant navy, royal dock yard, commercial ports, transportation offices, and industry. First, the task force had to be stocked with provisions for at least three months at sea. Second, a system had to be established for resupply without return to Britain. Third, a plan had to be conceived to support the concept of operation.[19] To achieve logistical support of such a large task force, the British requisitioned civilian ships to augment the Royal Fleet Auxiliary (RFA).[20] They modified these ships to accept military equipment, supplies, and soldiers. Additionally, in order to support the task force during the sea voyage, the RFA stationed fuel tankers throughout the route to the Falklands and a resupply ship in the vicinity of Gibraltar.[21]

Concurrently with the deployment, lead elements of the British forces landed at Ascension Island, preparing the island to operate as the intermediate staging area for the task force. Thousands of tons of supplies were flown to the staging area to support the amphibious task group.[22] Later, another logistics staging area was established at sea closer to the Falklands which had the capability to repair battle damage on vessels. The tug, repair, and logistics area operated on the northeast edge of the theater under the protection of the carrier battle group.

Command and control of logistics operations fell on Commodore Michael Clapp.[23] He was assisted in his task by an ad hoc multiservice logistics support cell which became invaluable in coordinating resupply. Lieutenant Colonel Ivar Hellberg, commander of the commando logistics regiment developed the concept for providing support to the land forces. The plan called for two landing ships to support one beachhead landing with replenishment ships remaining further at sea. A hospital ship also remained at sea ready to accept casualties evacuated by air. The concept, naturally, called for air superiority to allow a twenty four hours a day operation.[24] The following analysis of the sustainment concept compared to the sustainment criteria identifies the strong British cooperation and synchronization between service and industry, the choice of staging area, command, control, communications, and the proper use of logistics intelligence as the causes behind a successful operation. However, the British encountered problems in loading procedures and air superiority.

The synchronization served the British well as they planned and identified resources needed for the deployment of a contingency force without contingency plans on the shelves.[25] Furthermore, since the Falkland Islands were located far way from Britain, the deployment of the force to the area of operation became of crucial importance. Primarily, the British wanted to ensure that adequate combat power was provided up front to defeat the Argentine force. To solve the problem and ensure the availability of adequate transportation, the British requisitioned and transformed fifty merchant ships which were used during the campaign.[26]

Although the improvisation of requisitioning the ships was brilliant, it was lessened by the loading problems encountered due to the rush in deployment of the force. Loading occurred at a rapid pace to meet starting time deadlines and without regard to any loading plan.[27] This ultimately resulted in a loss of accountability. The British attempted to relocate loads on ships enroute to the Falklands but could not completely correct the errors caused at the port of

embarkation. Combat units would experience shortages during the battle because supplies were located too deep in the ship's storage holds and because accountability had been lost. For example, a shortage of helicopter heavy lift occurred during the operation because all assets were loaded on a single ship and subsequently lost when the ship sunk. A key lesson to learn from this operation is the importance of planning for loading and the priority given in loading assets.

The staging identified at Ascension Island became one of the major reasons behind the British success and demonstrated the need for staging when conducting operations in remote areas with limited or no support structure in place. The Ascension Island allowed the British to decrease the distance between their homeland and the battlefield by half and, by the same token, allowed the British to reduce the order-receipt time for all supplies.

A sound and synchronized command, control, and communication system enhanced the chance for success. At the strategic level, a small group of ministers managed the crisis on a daily basis with the Prime Minister.[28] This group established clear guidelines for the operations commanders yet did not interfere with them 8,000 miles away. Satellite communications allowed clear coordination without excessive security precautions. Command and control for sustainment rested with Commodore Clapp and the planning for the operational sustainment with Lieutenant Colonel Ivar Hellburg. Even though command and staff elements had to separate on numerous occasions due to the poor availability of ships, command and control remained intact.

The British applied a good intelligence analysis prior to deploying their force to the Falklands and in choosing the landing site.[29] They realized that the untrafficable terrain would eliminate the need for trucks in support of the force. They thus adjusted the loading of assets in Britain by reducing the amount of trucks while increasing helicopters deploying to the theater. Additionally, based on terrain analysis and the enemy situation, the British identified San Carlos

as the landing site. San Carlos provided good beaches for the landing and protection from the enemy air and submarine attacks.

The battle of the Falklands emphasized the importance of air superiority in the deployment of forces far from home.[30] The British counted on early air superiority as essential in allowing twenty-four hours logistics support. Their failure to achieve this goal resulted in a slow down of logistics support to such an extent that it took nearly a week to build up enough supplies ashore to allow movement out of the lodgement area. Had Argentine identified the correct decisive point in the British Task Force, its logistics lifeline, and attacked logistics ships by air, the British would have found the campaign significantly more difficult.

The medical plan was an extension of the synchronization among the three services. The plan called for air evacuation of casualties, forward medical teams augmenting combat units, and a field surgical team with a surgeon placed as far forward as possible for immediate support. However, the lack of air superiority adversely affected medical support.[31] Delays in medical evaluation occurred as the logistics ships seeking protection from air attacks were forced farther to sea. The increase in helicopter requirements to transfer supplies from ship to ship and ship to shore drew assets away from casualty evacuation, as dedicated lift had not been identified for casualty evacuation. This problem, added to the terrible terrain, prevented soldiers from carrying a wounded man to a pickup point, resulted in the unnecessary severity of casualties.

Finally, the British recognized the criticality of sustaining forces, prisoners of war, and civilian populace after the campaign. Therefore, the British captured Port Stanley not only as an operational objective but also for logistics purposes. They expanded the Port Stanley airfield to accept air resupply from Ascension Island.[32] The expansion called for 6,000 tons of material, 5,000 tons of emergency stores, and 1,000 engineer troops. The British also realized that the port needed upgrading to accept civilian shipping. In order to augment Port Stanley discharge

capacity, the task force carried all organic port facilities in terms of mooring lighters and other requirements.

In summary, the British succeeded in supporting the operation by properly synchronizing the logistics support of a multiservice force, ensuring that the command and control remained intact and clear throughout the operation, and establishing staging operations and rapid resupply procedures to support combat units. However, the British also experienced significant logistical difficulties. First, similar to the operation in their Dominican Republic campaign, they experienced problems with loading procedures. The cost of rushed loading ultimately resulted in a delay in combat operations. Second, they experienced logistical drawbacks due to the lack of protection against enemy air attacks. The need for air superiority to protect logistics functions (an insignificant problem during the U.S. invasion of Grenada) surfaced in this operation because of the higher level of technology used by both parties to wage war. The British demonstrated that planners must anticipate the air threat and protect logistics lifelines accordingly. Overall, the results of this logistics effort were astronomical. In seven weeks, the task force assembled 28,000 men and 1,000 ships, sailed 8,000 miles, and provided support to 10,000 men ashore.

The operations delineated in the above case studies exemplify logistical prowess and improvisation. However, the operational battlefields of the future in which speeded-up acquisition, processing, and rapid sharing of information would revolutionize the conduct and tempo of battle dictate changes in logistical doctrine for maintaining the forces. In an attempt to meet these changes, Army publication, Force XXI Operations, spells out five characteristics for future land operations. They are: doctrinal flexibility to meet the diversity ahead; strategic mobility with emphasis on anticipation, repositioning, early entry, lightness, lethality, survivability, and investment in strategic lift; tailorability and modularity fitting the particulars

of contingency forces; joint, multinational and interagency connectivity; and finally, versatility--resting on qualitative edge and decisive power in war and in operations other than war.[33]

JCS Publication 4-0, Doctrine for Logistics Support of Joint Operations, identified seven principles of logistics which complement principles of war: responsiveness, simplicity, flexibility, economy, attainability, sustainability and survivability. For logistical purposes, responsiveness is providing the " right support in the right place at the right time."[34] In opposed amphibious operations today, a landing team would create a beachhead and establish a support base ashore as quickly as possible, then push out from that base to other objectives. Within minutes, shore party and helicopter support teams would move ashore to organize and establish beach and landing zone support areas. When fully developed, the combat service support area may spread over a thirty to forty square mile area, hold thousands of tons of ammunition, thousands of containers of supplies, millions of gallons of petroleum and water, and house such support services as equipment maintenance, medical care, and holding enemy prisoners of war.[35] Amphibious operations as envisioned by the conceptual "Operational Maneuver From the Sea" call for the deployment of landing forces directly from the ships to their objectives, with most of their logistical support sea based. This process, at least initially, would eliminate the stockpiling of tons of material on the beach--greatly reducing the expeditionary force's footprint while maintaining a high optempo. To be successful, logistics planners must be capable of providing material and supplies, in the right amount and at the right time to U.S. forces on the ground.

Logistical support must be simple and flexible. As identified by JCS Pub 4-0, logistical planners must avoid complexity.[36] Mission-type orders and standardized procedures should contribute to this simplicity. To simplify the operation, logistics planners must be able to clearly articulate support priorities and reallocate supplies and services by the supported units. Commanders must maintain positive control over subordinate organizations to maintain

flexibility.[37] Logistics planners must be able to adapt logistics structures and procedures to changing situations, missions, and concepts of operation. Attainability is the ability to provide the minimum essential supplies and services required to begin combat operations.[38] It is the responsibility of the commander's staff to develop the concept of logistics support and the logistic estimate to match the support commander's requirements, priorities, and apportionment. And, they must provide this support at the least cost.

In future contingency operations, resources will be scarce. Military leaders must learn to do more with less. Once the minimum level of support is on hand to support the initial phase of the operation, the joint logistic staff must be capable of sustaining the operation. The concept of split-based logistics is currently receiving a lot of attention with the Army structure. A concept relying on assured communications systems that allowed much of the logistics base to remain in the United States; those elements received and acted on information and sent necessary supplies forward. Versatility, not only operational and tactical, but strategic is seen as central to the Army vision of its responsibility for the outcome as well as the conduct of sustainment operations.[39]

Sustainability focuses the supporting commander's attention on long-term objectives and capabilities of the supported forces. And finally, the concept of support must provide for provisions in the face of destruction. Logistical support over the horizon will require active measures to safeguard logistics bases at sea as well as those units deployed ashore.

From a doctrinal standpoint, there must exist a balance between combat forces and logistic forces. Each campaign will demand it own analysis of the proper balance between supported and supporting forces: supported forces versus combat forces, and supporting forces versus logistics force rations are ways of assessing requirements and capabilities.[40] The requisite strength of combat support/combat service support elements depend on many factors

such as the gross requirements for logistic resources and where and when they are needed, the adequacy of available transportation networks and assets, the length of the LOC, and the types of operations being supported.[41] Logistics planners must recognize these limitations and include them in their logistical planning.

Part II: Technical Analysis

In chapter 3, the thesis outlined the composition of the hypothetical sample force and postulated scenario as a baseline for assessing the logistics requirements and sustainment issues arising from the deployment of Army ground units ashore from Navy vessels at sea. Lacking the comprehensive data and analytic tools to complete a rigorous quantitative analysis, this study is a "worst case " assessment utilizing a hypothetical force. Although delineated in an earlier chapter of this thesis, the postulated scenario is repeated here for ease of reference.

Scenario

The United States has deployed an amphibious task force, consisting of a Carrier Battle Group and an Amphibious Readiness Group to the littoral waters of a coastal belligerent nation. These forces, including ground forces of an Armored Cavalry Regiment (Light) are deployed into the area without the benefit of fixed port facilities, established infrastructure, or host-nation support. While still over the horizon, the task force deploys three landing teams (armored cavalry squadrons) to objectives well inland and widely dispersed, up to one hundred nautical miles from the amphibious task force. As an initial entry force, the ACR (light) would support the Joint Task Force operations with credible force as a demonstration of U.S. resolve. They are landed and sustained by air and sea using LCACs, CH-53Es and MV-22s. These landing teams will serve to place and monitor sensors, direct ship-to-shore fire and air strikes, block and confuse enemy actions and ultimately attack to achieve a limited objective. They will operate at a long

distance from the ships, over the horizon, for one to seven days. Weather conditions for this operation will be light to moderate, having no adverse effect on maritime operations. Likewise, sea state conditions will be negligible.

TABLE 2

LANDING TEAM COMPOSITION

Armored Cavalry Regiment (Light)	No. of People
HHT	150
Armed Cav Sqdn, ACR (3)	2492
Regt Aviation Sqdn	489
ADA Btry Vul/Stinger	172
Engr Co.	200
MI Co.	159
Chml Co.	73
Total	4463
Spt Sqdn	728

Source: Department of the Army, ST101-6, G1/G4 Battle Book (Ft. Leavenworth, KS: USACGSC, July 1996), 1-18.

TABLE 3

AMPHIBIOUS FORCE CAPABILITIES: 2010-2015

Ship Type	No.	Troops	Vehicle (Sqft)	Cargo (Cuft)	Helos	LCACs
LHA	5	1,713	25.4	106	42	1*
LHD	7	1,892	20.1	125	45	3
LPD-17	12	720	25.0	25	6	2
LSD-41	8	454	13.5	5	0	4
LSD-49	4	454	13.1	40	0	2
Total Fleet	36	35,897	728	1,905	597	90
Available Fleet	30	29,944	606	1,614	498	74

Source: Department of the Navy, Force 2001: A Program Guide to the U.S. Navy (Washington, DC: Government Printing Office, 1995), 35.

* LHA can carry 1 LCAC and 2 LCU-1600 or 4 LCU-1600
**CH-46 equivalent is a common unit of measurement for describing the helicopter carrying capacity of a ship. For example, a CH-53E is equivalent to 1.9 CH-46s on an LHD; and MV-22 is equivalent to 1.45.

TABLE 4

AMPHIBIOUS SHIP CHARACTERISTICS/CAPABILITIES

	LHA Tarawa Class	LHD 1 WASP Class	LSD/41/49 Whidby Island Harpers Ferry	LPD 17
Length	820 ft	844 ft	609 ft	---
Beam	106 ft	106 ft	84 ft	---
Displacement	39,300 tons	40,530 tons	17,745 tons	---
Draft	27 ft	26.5in	20.5 ft	---
Speed/prop	24 kts/steam	24 kts/steam	20 kts/diesel	---
Capabilities				
Crew	956	1113	340	
Staff	87	90	none	none
Troops	1903	1873	484	700
Cargo				
Vehicles	28,700 sqft	25,500 sqft	12,500 sqft* 20,200 sqft	25,000 sqft
Cargo	141,200 cuft	166,600 cuft	3924 cuft/* 67600 cuft	25,000 cuft
Welldeck	19,000 sqft	16,100 sqft	22,000 sqft	
Sample deck load load	39AAV veh deck and 2LCU/1LCAC or 4LCU	39 AAV veh deck and 3LCAC or	4LCAC/2LCAC or 3LCU/1LCU or 4AAV/na	2LCAC
Hanger Capacity	Y/43 CH-46 equav.	Y/46 CH-46 equav.	N	Y/6 CH-46 equav.
Deck spots	9	9	2	2
Medical facilities	300 bed 3 operating rms.	600 bed 6 operating rms.	limited	limited
Commanded by	06	06	05	05

Source: Department of the Navy, Force 2001: A Program Guide to the U.S. Navy (Washington, DC: Government Printing office, 1995), 69-70.

Notes: (1) Typical LHA aircraft mix includes 4 CH-53E, 14 CH-46, 4 AH-1, two UH-1 and six AV-8B. LHDs have additional room for a slightly larger aircraft mix.

TABLE 5

AVIATION CHARACTERISTICS OF MEF

Fixed Wing Aircraft	
F/A - 18	0
AV - 8B	60
Rotary Wing Aircraft	
MV - 22	144
CH - 53E	64
UH - 1	24
AH - 1	224

Source: Calculations provided by Deployment and Logistics Working Group participating in the Naval Studies Board's study of the Department of the Navy's future capabilities (July 1995), 4.

TABLE 6

MAXIMUM OVER-THE HORIZON DAILY TRANSPORT CAPACITIES
(per vehicle)

Vehicle	Distance	Max Load Capacity (Stons)	Trips Per Day	Max. Daily Capacity Capability (Stons)
LCAC	25nm	60/trip	5	300
CH-53E	100nm	16/trip	2	32
MV-22(external)	100nm	5/trip	3	15
MV-22(internal)	100nm	3/trip	4	12

Source: Calculations provided by Deployment and Logistics working Group participating in the Naval Studies Board's study of the Department of the Navy's future capabilities (July 1995), 5.

TABLE 7

OVER-THE-HORIZON TOTAL DAILY TRANSPORT CAPACITIES

Vehicle	Nr.	Degraded capacity Per vehicle (Ston)	Total Daily Capacity
LCACs	74	225	14,153
CH-53E	64	24	1,306
MV-22(External)	144	11.25	1,377

Source: Calculations provided by Deployment and Logistics Working Group participating in the Naval Studies Board's study of the Department of the Navy's future capabilities (July 1995), 6.

Note: Maximum daily capacity degraded to account for craft operational availability (85%) and average load (75% maximum).

Amphibious Force Ship-to-Shore Transport Capacities. The primary ship-to-shore assets for over-the-horizon transport in 2015 will be the LCAC, CH-53E and MV-22. Their daily transport capacities are summarized in Tables 5 and 6: calculations are in Appendices A and B. The capacities assume the ships are 25 miles from the shore and the land forces 75 miles inland; loads are 75% of the maximum capacity. We assume the LCACs will operate only between the ships and the shoreline; transport inland is by aircraft and trucks.

TABLE 8

TASK FORCE DAILY SUSTAINMENT REQUIREMENT

Unit: 17440L500 Armored Cav Regiment

Day One:

Supply Class	Units	Pounds	Short tons
Class I - A Ration	0EA	0.00	0.00
- B Ration	0EA	0.00	0.00
- C Ration	0EA	0.00	0.00
-MRE	13,317 EA	20,907.69	10.454
-LRP (I)		0.00	0.00
-HCP1		3,418.03	1.709
-HCP2		244.15	0.122
-R/CW		0.00	0.00
Class I Subtotal**		24, 569.97	12.285
Class II		9,281.95	4.641
Class III Packaged		2,263.89	1.132
Class IV - Barrier		17,756.00	8.878
Class IV - Construction		19,975.50	8.878
Class VI		15,092.60	7.546
Class VIII		2,485.84	1.243
Water	81,678 Gal	680,374.41	340.187
Mail		5,948.32	2.974
Unit Total		777,748.32	388.874

Total Daily Sustainment Requirement (cont.)

Days 2-4:

		Units	Pounds	Short tons
Class I	-A Ration	0EA	0.00	0.00
	-B Raton	0 EA	0.00	0.00
	-T Ration	8,878 EA	22,860.85	11.430
	-MRE	4,439 EA	6,969.23	3.485
	-LRP (I)		0.00	0.00
	-HCP1		3,418.03	1.709
	-HCP2		244.15	0.122
	-R/CW		0.00	0.000
Class I	- ***SUBTOTAL***		33,492	16.746
Class II	-		9,2281.95	4.641
Class III	- Packaged		2,263.89	1.132
Class IV	- Barrier		17,756.00	8.878
Class IV	- Construction		19,975.50	9.988
Class VI			15,092.60	7.546
Class VIII			2,485.84	1.243
Water		81,678 Gal	680,374.41	340.187
Mail			5,948.26	2.974
Unit Total			786,670.71	393.335

Note: Requirements determined using CASCOM's OPLOGPLN 1.30 PROGRAM (January 1996).

TABLE 9

ESTIMATED BULK POL CONSUMPTION

Day One:		Tank Capacity	Consumption	Weight
	JP8:	19,285.00	35,864.00	235,375.43
	DSL:	201,733.00	154,689.20	1,081,586.89
	MOG:	962.00	12,028.92	74,615.39
	Total	221,980.00	202,582.12	1,391,577
Day 2-4:		Tank Capacity	Consumption	Weight
	JP8:	19,285	35,864.00	235,375.43
	DSL:	210,733.00	154,689.00	1,081,586.89
	MOG:	962.00	12,028.00	74,615.39
	Total	221,980.00	202,582.12	1,391,577.71

Note: Requirements determined using CASCOM's OPLOGPLN 1.3 program (January 1996).

TABLE 10

ESTIMATED AMMUNITION CONSUMPTION

Day One:

Weight: 986,105.72 Cube: 21,451.354 Stons: 493.05 Lbs/Man/Day: 222.15

Days 2-4:

Weight: 746,262.66 Cube: 17,558.029 Stons: 373.13 Lbs/Man/Day: 168.12

Note: Requirements determined using CASCOM's OPLOGPLN 1.3 program (January 1996).

TABLE 11

TOTAL WEAPON SYSTEMS (ACR)

108 HMMWVs (TOW)	180 HMMWVs (Scout)
24 155-mm towed hows	18 120-mm morts
24 Avengers	

Major Pieces of Equipment:

Supply and Transport Troop:

2	FAWPSS	12	semitrlr, flatbed, 22.5 ton
12	tank, fab, collap, 1,500-gal, wtr	22	5,000-gal tankers
35	trk, tractor, 5-ton	1	trk, FL, RT, 4000-lb
4	water pur, 600-gal	24	trk, cgo, 5-ton dropside
		4	trk. FL, 6,000-lb

Medical Troop:

8	HMMWV ambulance, 4-litter	8	M113 ambulance

Ordnance (Maint) Troop:

3 HETs

Source: Department of the Army, ST 100-3, Battle Book (Ft. Leavenworth, KS: USACGSC, June 1996), 2-77.

TABLE 12

LANDING TEAM LANDING REQUIREMENT

	No.	LCAC Trips	MC-22 Trips	CH-53E Trips
People	3570	74	74	0
Howitzers	66	0	0	66
Light Armored Vehs	296	65*	36	0
Trucks and Trlrs	127	80	57	0
		219	167	66

Note: Calculations based on deploying 80 percent of ACR and equipment. Personnel will be transported by LCACs and MV-22s, heavy equipment by CH-53s, other equipment and supplies split between LCACs and MV-22s.

TABLE 13

LANDING TEAM DAILY SUSTAINMENT REQUIREMENT

	Stons	LCAC Trips	MV-22 Trips	CH-53E Trips
Rations (Including Wtr (gal))	388	9	0	0
Ammo	493	10	21	0
Fuel	750	0	157**	42***
		19	178	42

Note: Calculations based on deploying 80 percent of ACR and equipment.
* LCAC can carry up to 4 LAVs per trip.
**Weight is not the limiting factor for transporting fuel. MV-22 can carry two 500-gallon pods externally.
***CH-53E can carry three 500-gallon pods externally.

TABLE 14

TOTAL TRIPS PER DAY*

		Capacity/Requirement
	No.	Trips
LCACs	74	314/238
MV-22s	144	366/345
CH-53Es	64	108/108

Note: *Maximum daily capacity degraded to account for craft operational availability (85%). Table summarizes lift requirements (trips) for landing ACR, its equipment and one day's sustainment.

Results

An initial analysis of the Marine Corps' amphibious ship capabilities, its maximum over-the-horizon transport capability, and the daily sustainment requirements of the hypothetical sample force appear to indicate that our concept of support is probably neither feasible nor advisable for operations extended over a sustained period of time (greater than seven days). Providing for and sustaining an organization as large as an Army's Armored Cavalry Regiment extends the force structure and logistical capabilities of the Marine Corps to its very limits. Furthermore, committal of the Corps' entire force capacity to a single major regional conflict (MRC), more than likely, misses the aim for the modern-day military and was certainly not the intent of this study. In short, the initial findings of this study indicate that sustaining such a force (an Army's ACR) would be a monumental, if not impossible, task. Nevertheless, it does support the primary question of this thesis. While sustaining an ACR may not be executable, support of a lesser-sized force is certainly feasible and within the capabilities of the Maritime Expeditionary Force.

The most limiting factors to supporting an organization the size of a 4,000-man-plus Armored Cavalry Regiment is the number of amphibious ships available for the operation and the total number of heavy airlift assets available. The amphibious force structure planned for the out-years 2010-2015 project a maritime force with a total of thirty-six amphibious ships. The exact makeup of these ships and their capabilities are outlined in table 4. Despite our most ambitious efforts to extend this force, the Corps will probably have no more than thirty ships available for deployment at any one time.

Historically, the Corps has maintained a force structure capable of responding to a two-MRC scenario, in which the proponents of its force would be divided between the two regional conflicts. Accepting this policy, only fifteen to sixteen ships would be available to support the

scenario. Currently, the suitability and acceptability of maintaining a force structure capable of responding to two MRCs is being debated by U.S. political and military leaders with no clear-cut solution on the horizon. Nevertheless, Americans can assume that the U.S. military will always maintain a force structure capable of responding to at least one MRC and one lesser regional conflict (LRC).

Extending this line of reasoning to the scenario presented in this thesis, the Corps will probably not commit more than half of its force capabilities to a MRC. Therefore, the total force capability used in the hypothetical scenario of this study can be realistically reduced by half or fifteen ships. Likewise, this thesis will institute similar reductions to the remainder of the Corps assets and capabilities including heavy airlift. The corresponding loss of heavy lift assets would be the most difficult problem to overcome.

The ability to move a large volume of fuel and other large amounts of liquid bulk material over extended distances is perhaps the most constraining issue for logistical planners. The issue is not one of weight, but the number of pods which can be transported externally by organic airlift. The CH-53Es currently employed in the fleet can only move three 500-gallon pods externally at a time, the MV-22 can transport two pods externally. Working with a force reduced by half, there would be only thirty-two CH-53Es, 72 MV-22s and 37 LCACs to move fuel shore; therefore, limiting the number of troops which could be reasonably sustain from over the horizon inland. In short, naval operations from the sea do encompasses operations in the rear area sustainment environment of Army ground units, but is limited to a force of 2,000 to 2,500 troops without the benefit of logistical sites ashore.

As stated earlier in this study, this assessment is a worst case scenario with the insertion of landing teams carrying a full complement of artillery and service support equipment. OMFTS, at least in concept, calls for the deployment of forces onto a beach without the landing

of artillery pieces. Fire support would be provided by naval air and combat ships operating within close proximity of the beach. Obviously, the logistically burden alleviated by the decision not to deploy these assets ashore would dramatically reduce the burden on heavy lift. However, the decision to deploy artillery with the landing teams is a decision of the task force commander and not one which should be left to logisticians. Nevertheless, this study included the addition burden of deploying troops with all of its combat arms and equipment to test the full logistical implications--the breaking point--of the operation. Because of this fact, the assessment derived from this study may be too conservative, leaving room for the deployment of a more flexible and lighter force.

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[1]Peter M. Dunn and Bruce W. Watson, American Intervention in Grenada (Boulder, CO: Westview Press, Inc., 1985), 131.

[2]Ibid., 161.

[3]Ibid., 89.

[4]Ibid., 162.

[5]Ibid., 82.

[6]Reynold A. Burrowes, Revolution and Rescue in Grenada: An Account of the U.S. - Caribbean Invasion (Westport, CT: Greenwood Press Inc., 1988), 80.

[7]Dunn and Watson, 163.

[8]Ibid., 165.

[9]Ibid., 76.

[10]Ibid., 94.

[11]Ibid., 120.

[12]Burrowes, 82.

[13]Dunn and Watson, 91.

[14]Burrowes, 83.

[15]Ibid.

[16]Linda Washington, Ten Years On: The British Army in the Falklands War (Great Britain: Jolly and Barber Limited, 1912), 103.

[17]Ibid.

[18]The Sunday Times of London , War in the Falklands: The Full Story (New York, NY: Harper and Row, Publishers, Inc., 1982), 145.

[19]Ibid.

[20]Ibid., 103.

[21]Ibid.

[22]Ibid., 104.

[23]Ibid., 186.

[24]Ibid., 157.

[25]Ibid., 145.

[26]Washington, 6.

[27]Ibid., 107.

[28]The Sunday Times of London, 177.

[29]Ibid., 192.

[30]Ibid., 206.

[31]Washington, 93.

[32]Ibid., 84.

[33]John L. Romjue, American Army Doctrine for the Post-Cold War (Fort Monroe, VA: Military House Office, 1997), p. 140.

[34]JCS, Joint Publication 4-0, Doctrine of Logistics Support of Joint Operations, (Washington, DC: Government Printing Office, 1992) p. II-1.

[35]Ibid.

[36]Ibid.

[37]Ibid., II-1.

[38]Ibid.

[39]American Army Doctrine for the Post-Cold War, 120.

[40]Ibid., II-5.

[41]Ibid.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

OMFTS is not a new concept. American military history provides many excellent examples of power projection launched from the sea. One such case is General MacArthur's bold operational strike at Inchon and the ensuring envelopment and defeat of North Korean forces in September 1950. However, significant advancements in technology, information systems , and mobility have rapidly changed the way in which naval forces project power forward from the sea. Additionally, the new world order and the corresponding realignment of the U.S. strategic direction combined with increasingly limited military resources and reductions in forward basing of U. S. forces dictate changes in the strategic course of military deployment decision making. This change in strategy has resulted in a greater emphasis on OMFTS. A medium which offers virtually unrestricted access and provides U.S. commanders a measure of flexibility in responding to conflicts in the littoral regions of the world.

The contingency forces deployed in future conflicts will serve important U.S. political, security, and economic interests. They will lend credibility to America's pledge to remain a global power and to meet its treaty commitment with its allies. In addition, these forwardly deployed forces will also contribute to the maintenance of regional balances of power, particularly as many up-and-coming powers have increased significantly their military capabilities and are becoming more adroit diplomatically.

The Department of the Navy has enacted a broad range of forward-looking programs, policies, and organizational changes designed to keep the Navy and Marine Corps in step with

rapidly changing national security challenges. The Navy's ability to successfully conduct a wide range of demanding, real-world operations over the last year has validated this approach and will set the stage for future operations.

This study attempted to objectively lay out a threefold analysis in historical, doctrinal, and futuristic context while accurately assessing the myriad of complex issues that would hamper the projection of naval operations ashore. Do maritime forces have the lift capability to support such an operation? Do the Navy have the logistical support structure in place to support it? What are the capabilities/limitations of the amphibious force? These are all credible issues, and ones which warranted critical review.

Table 14 summarizes the lift requirements (trips) for landing the Armored Calvary Regiment with its direct support artillery and combat service support elements. It also shows the number of trips that the postulated amphibious force of 74 LCACs, 144 MV-22s, and 64 CH-53Es could make in a day. Initial calculations indicate that the force assembled could move and support the ACR for operations as detailed in the hypothetical scenario. However, the number of trips required to move and sustain this size force demand the employment of the entire force capability of the Marine Corps--an unrealistic plan. But, this does not eliminate the naval expeditionary force as a supporting effort in the insertion and sustainment of a more limited sized force. Rough calculations indicate that a force of fifteen-to-sixteen amphibious ships with corresponding air assets could support an Army organization up to approximately 2,500 troops for a period of five-to-seven days. The tactical-level support functions provided would include maintenance, battle damage repair, engineering, cargo handling, fueling, arming, moving, material transhipment, personnel, and health services. Most of these services would, necessarily, be sea based allowing the forces ashore freedom of movement, reduction of footprint, and the ability to maintain a fast optempo.

To be successful in an operation of this magnitude, the U.S. Army and Navy must be prepared to erect changes in the way that they do business today. Modifying existing logistics organization is an approach that probably will not work. A design of modular logistics units will be required, allowing for a building-block approach where just enough functional capability can be deployed to support the contingency force. When the force or requirements of the force are expanded, modular logistics units can be added accordingly and forwardly deployed to support operations. Ideally, overlapping responsibility and battle space will demand that the military build organizations where mutual efficiencies are gained without sacrifices in combat effectiveness.

The future is now. While some effort must be devoted to configuring service support systems to tactically integrate with forces ashore, the technology exists today. The changing events of today (i.e., the information age, and rapid mobility) have forced overlapping coverage of battle space traditionally assigned to individual services. To be successful in this new environment, the services must continue to standardize operating procedures and support automation and communication architectures which would be beneficial to all.

Development of a truly seamless logistical system is not far away in the future. It can be done today, on a limited scale as outlined in this thesis. It will require a shift in strategic thinking and support from the highest levels to make it fully functional. Nevertheless, this study can conclude that naval operations do encompasses operations in the rear-area sustainment environment of army ground unit.

Disclaimer

This study has, by no means, address all of the possible logistical support issues and problems that will confront contingency forces as they deploy around the globe to defend U.S.

interests (i.e., logistical intelligence, command and control, and maintaining air superiority). These are topics which warrants attention and can be developed further in other studies. It was simply not the intent of this paper to do so. It was also not the intent of this study to justify the selection of Army ground troops over the U.S. Marine Corps in the assignment of forces in the traditional sense. Rather, this study assumed that the nation's military leaders have selected the best fighting force for the mission and the current situation--to secure and maintain the tactical advantage and initiative over a potential adversary. The next fifteen to twenty years of military history will be seen as a time of transition between a century of persuasive conflict and a twenty-first century information age, an unknown era of strategic review in which the United States' security challenges would be diverse in type and technology and in which change would be constant. The military must be prepared doctrinally for all possibilities. It must be capable of creating innovative and imaginative combinations of technology and forces in an effort to harness military change.

In keeping with this line of thinking, the exact makeup of future contingency forces deployed around the world to safeguard U.S. interests will be, necessarily, situational dependent utilizing the elements of METT-T as the ruling factors at the tactical and operational levels. Military planners must always consider the mission, enemy, terrain and weather, and troops in relations to the time available when planning for operational missions. Therefore, the assignment of Army ground forces in this study should not be the primary issue. The focus of this thesis was simply to determine whether or not naval operations in the littoral encompass operations in the immature rear-area sustainment environment of Army ground units. The results of this study answer in the affirmative.

APPENDIX A

HELICOPTER LIFT CAPABILITIES

Characteristics		CH-53E	MV-22
Load	External	16 Stons	5 Stons
	Internal	6.5 Stons	3 Stons
Passengers		53	24
Speed	External	80kts	120kts
	Internal	150kts	240kts
Combat radius w/o refuel		200nm	110nm w/external load 200nm w/internal load

Assumptions		
	Distance from ship to unit	100nm
	Flight path distance	120nm
	Daily operating time	8 hr.

	Computations CH-53E External	MV-22 External	MV-22 Internal
Upload Time	30 min	30 min	30 min
Outbound Transit Time	90 min	60 min	30 min
Download Time	15 min	15 min	15 min
Return Transit Time	48 min	30 min	30 min
Total Trip Time	183 min	135 min	105 min
Calculated Trips per Day	2.62 trips	3.55 trips	4.57 trips
Complete Trips per Day	2 trips	3 trips	4 trips

APPENDIX B

CALCULATION OF LCAC LIFT CAPABILITY

Max. CAPABILITY	60Ston (overload to 75 Ston)	
	1809 sq ft	
	24 people	
Refueling:	Uses 100 gal/hr. Refuel every 4 hr. Takes 15 minutes.	
Speed:	(A function of sea state)	
	0 to 1	40+ kt
	2	35
	3	30
	4	25
Loading/unloading time	30 min/15 min for RO/RO	
Sample loading	I M1A1 tank or 4 LAVs and 2 AAVs	

Trips Per Day
(12 hours per day operations)

	For 25 nm	For 50 nm
Upload Time	30 min	30 min
Outbound Transit Time	43 min	86 min
Download Time	15 min	15 min
Return Transit Time	43 min	86 min
Total Trip Time	131 min	217 min
Calculated Trips per Day	5.49 trips	3.32 trips
Complete Trips per Day	5 trips	3 trips

LCAC: the high-speed, fully amphibious landing craft is capable of carrying a 60-ton payload (75 tons in overload) at speeds in excess of 40 knots, up to a nominal range of 200 nautical miles. Its ability to ride on a cushion of air allow s it to operate directly form the well deck of LHD, LPD and LHA class ships. Carrying equipment, troops, and supplies, the LCAC launches form the shp's will deck and transits at high speed over the waves, through the surf zone, and across the beach to a suitable offload site ashore where it quickly offloads and the returns for

reload and follow-on sorties. LCACs provide the commander, amphibious force (CATF) tremendous flexibility in selecting landing sites as compared with conventional landing craft, which could approach only 17 percent of the world's potential beach heads. The LCAC now permits access to more than 75 percent of the world's beaches, delivering its cargo onto dry land.

APPENDIX C

UNIT DODIC SUMMARY FOR ARMD CAV REGT

DODIC	DODIC Nomenclature	ROUNDS	WGT	CUBE
A059	CTG 5.56MM BALL M855	338,148	16,907	338
A063	CTG 5.56MM TRCR M856	77,004	3,080	77
A064	5.56MM LKD 4-1	38,178	2,290	38
A068	CTG 5.56MM TRCR M196	506	20.24	.506
A071	CTG 5.56MM BALL M193	2,222	111	2.22
A131	7.62MM 4/1 TRCR LKD	285,486	28,548	570
A165	7.62MM 9/1 TRCR LKD	229,080	18,326	229
A363	CTG 9MM BALL	4,170	166.80	0.00
A400	CTG CAL.38 M41	320	12.80	0.320
A475	CTG CAL .45 BALL	74	4.44	.074
A576	CTG .50 CAL MB	68,977	26,901	344
A589	CTG .50 CAL AP	930	372	4.65
A653	CTG 20MM HEI M56	33,250	36,575	432
A655	CTG 20MM HEI M56	0	0.00	0.00
A792	CTG 20MM HEI-T M246	0	0.00	0.00
A965	25.44MM DECOY	1,232	726	0.00
A974	CTG 25MM APDS-T	10,750	21,500	537.5
A975	CTG 25MM HEI-T M792	17,375	34,750	868
A986	25MM APDS-T	0	0.00	0.00
B504	40MM GRST	247	259	4.94
B505	40MM RDST	247	247	4.94
B506	40MM RDSM	494	513	9.88
B508	40MM GRSM	494	513	9.88
B509	40MM LSM	494	513	9.88
B535	40MM WHITE	247	256.88	5.68
B536	40MM WHITE	247	256.88	5.43
B537	40MM RIOT CON	1235	2013	38.2
B542	CTG 40MM HEDP M430	4212	5938	113
B546	40MM HEDP M433	2964	2193	53.3
B572	CTG 40MM HE M383	5796	6143	173
C379	120MM HE/MO	0	0.00	0.00
C623	CTG 120MM SMK XM929	234	11,220	167
C624	CTG 120MM ILLU XM930	36	1726	25.8
C625	CTG 120MM HE XM934	1944	93,214	1393
C786	CTG 120MM APFSDS-T	779	62,287	1868

C787	CTG 120MM HEAR-MP-T	483		42,731	1160	
D061	155MM DDARM XM898	16		1768	18.8	
D501	155MM HE ADAM	0		0.00	0.00	
D502	155MM HE ADAM	120		13,343	146	
D503	155MM HE RAAMS	0		0.00	0.00	
D505	155MM ILLUM	36		3562	30.8	
D509	155MM HE RAAMS	0		0.00	0.00	
D510	155MM COPPERHEAD	1		148	3.18	
D514	155MM RAAMS-S	189		20,850	225	
D515	155MM RAAMS-L	1		79.38	0.8	
D528	155MM SMOKE WP	75		8190	90.8	
D532	PROP CHARGE M203	37		1909	36.7	
D533	PROP CHARGE M119A2	1701		72,297	2211	
D540	PROP CHARGE M3A1	306		6420	152	
D541	PROP CHARGE M4A2		563		17,172	563
D544	155MM HE M107	975		97,151	831	
D550	155MM WP M110	0		0.00	0.00	
D563	155 HE ICM M483	834		91,088	1011	
D570	165MM HEP M123	51		4712	86.7	
D579	155 HE RAP M549A1	116		11,812	138	
D864	155MM BASEBRN	73		7944	87.3	
G815	GREN SMOKE RP L8A3	961		6006	72	
G826	GREN IR M76	961		5448	77.8	
H116	RKT 2.75IN SMK M259	342		11,812	299	
H163	RKT 2.75 HE	0		0.00	0.00	
H164	RKT HE HYDRA 70 M151	50		1789	38.8	
H180	RKT 2.75 ILL M257	76		1824	36.7	
H183	2.75 ILLUM	0		0.00	0.00	
H184	2.75 SMK	0		0.00	0.00	
H464	RKT HE FYDRA TO M262	1429		56,810	1250	
L410	FLARE ACFT M206	1232		825	14.7	
M443	DEMO KIT (MICLIC)	0		0.00	0.00	
MD73	DTG IMP M796	1232		36.96	1.23	
N285	FUZE MT	2117		7219	133	
N286	FUZE MT	0		0.00	0.00	
N340	FUZE PD M739	2056		7174	129.5	
N464	FUZE PROX M732	762		2658	47.9	
N523	PRIMER PERC M82	2068		248	8.27	
PA66	TOW	1185		105,465	5214	
PL90	STINGER MSLE	0		0.00	0.00	
T087	CANISTER MINE XM87	0		0.00	0.00	
T929	CTG 120MM SMK XM87	0		0.00	0.00	
T930	CTG 120MM ILLU XM930	0		0.00	0.00	
T934	CTG 120MM HE XM934	0		0.00	0.00	

UNIT TOTAL FOR ARMD CAV REGT

WEIGHT: 986,105 CUBE: 21,451.354 STONS: 493.05 LBS/MAN/DAY: 222.15

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